PAT-NO: JP405146121A

DOCUMENT-IDENTIFIER: JP 05146121 A

TITLE: MOTOR

PUBN-DATE: June 11, 1993

INVENTOR-INFORMATION:
NAME
YAMAUCHI, HIDEKI

ASSIGNEE-INFORMATION:

NAME	COUNTRY
YAMAUCHI HIDEKI	N/A

APPL-NO: JP03300889

APPL-DATE: November 16, 1991

INT-CL (IPC): H02K016/02, H02K021/12

US-CL-CURRENT: 310/68B, 310/114

ABSTRACT:

PURPOSE: To provide a motor having higher torque converting efficiency by converting the magnetic lines of force of the N and S magnetic poles of the rotor or stator into torque simultaneously.

CONSTITUTION: A rotor part is composed of internal and external rotors 4a and 4b arranged concentrically around its output axis 3 as a center, and the rotors 4a and 4b are coupled into one united body with a coupling and supporting member 10 at their left-hand ends and fixed to the output axis 3 through the medium of the coupling and supporting member 10. A stator 5 is arranged between both rotors 4a and 4b concentrically to the rotors 4a and 4b, and its right-hand end part is united with the right-hand internal surface of a case 2 into one body and fixed. The external rotor 4b has a linking protrusion 6 at the right-hand end, and this linking protrusion 6 is linked in a freely rotatable and movable state to a linking recessed groove 7 formed on the right-hand internal surface of the case 2 circularly around the output axis 3 as a

center. Whereas, the stator 5 has a linking and fixing protrusion 8 at its left- hand end, and linked in a freely rotatable and movable state to a circular linking recessed groove 9 formed on the left side surface of the coupling and supporting member 10.

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(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号

特開平5－146121

(43)公開日　平成５年(1993)６月11日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｈ０２Ｋ　16/02		7346－5H		
21/12		Ｍ　6435－5H		

審査請求　未請求　請求項の数７(全　６　頁)

(21)出願番号　特願平3－300889

(22)出願日　平成３年(1991)11月16日

(71)出願人　391059850
山内　英樹
大阪府大阪市天王寺区烏ケ辻１丁目８番９－509号

(72)発明者　山内　英樹
大阪市天王寺区烏ケ辻１丁目８番９－509号

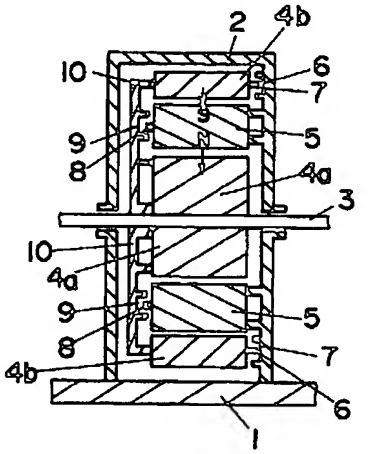
(74)代理人　弁理士　石田　長七　(外２名)

(54)【発明の名称】　電動機

(57)【要約】

【目的】回転子或いは固定子のＮ，Ｓ磁極の磁力線を同時に回転力に変換させることにより回転力に変換させる効率を向上させた電動機を提供するにある。

【構成】回転子部は出力軸３を中心として同心状に配置された内外の回転子４ａ，４ｂから構成され、回転子４ａ、４ｂは左側端部が連結支持部材１０により一体に連結され、連結支持部材１０を介して出力軸３に固定されている。固定子５は両回転子４ａ，４ｂの間に回転子４ａ，４ｂに対して同心状に配置され、右側端部がケース２の右側内面に一体となって固定されている。外側回転子４ｂは右端部に係合突起６を突出し、この係合突起６を出力軸３を中心として円周状にケース２の右側内面に形成した係合凹溝７に回転移動自在に係合保持させ、一方固定子５は左側端部に係止突起８を突設し、連結支持部材１０の左側面に形成した円周状の係合凹溝９に回転移動自在に係合保持させている。



1	台座
2	ケース
3	出力軸
4a，4b	回転子
5	固定子
6	係合突起
7	係合凹溝
8	係合突起
9	係合凹溝
10	連結支持部材

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【特許請求の範囲】
【請求項１】回転子と固定子とを出力軸を中心として同心状に配置した構成を基本構成とする電動機において、固定子の磁極に夫々回転子を対面させたことを特徴とする電動機。
【請求項２】回転子と固定子とを出力軸を中心として同心状に配置した構成を基本構成とする電動機において、回転子の磁極に夫々固定子を対面させたことを特徴とする電動機。
【請求項３】回転子と、固定子とを交互に同心状に多重に配置するとともに、各回転子を出力軸に連結固定して回転子部を構成したことを特徴とする請求項１又は２記載の電動機。
【請求項４】固定子の内側と、外側とに回転子を同心状に夫々配置して、夫々の回転子を固定子の内側の磁極と、外側の磁極とに対面させるとともにこれら回転子を出力軸に連結固定して回転子部を構成したことを特徴とする請求項１又は３記載の電動機。
【請求項５】回転子の内側と、外側とに固定子を同心状に夫々配置して、夫々の固定子を回転子の内側の磁極と、外側の磁極とに対面させたことを特徴とする請求項２又は３記載の電動機。
【請求項６】回転子の内側と、外側とに固定子を同心状に夫々配置して、該回転子の内側と、外側とに夫々の固定子の外側の磁極と、内側の磁極とを対面させたことを特徴とする請求項２又は３記載の電動機。
【請求項７】固定子、回転子を夫々支持する各支持部材に対面した回転子、固定子の端部を回転移動自在に係合保持する手段を各支持部材に設けたことを特徴とする請求項１又は２又は３又は４又は５又は６記載の電動機。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、電動機に関する。
【０００２】
【従来の技術】従来の各種の電動機の多くは、回転子と固定子とよりなり、固定子巻線を持つ固定子、或いは永久磁石からなる固定子のＮ，Ｓ磁極の何れか一方に対面するように回転子を配置していた。また別の電動機では、回転子の巻線或いは永久磁石のＮ，Ｓ磁極の内の何れか一方のみに固定子を対面させていた。
【０００３】このような構成では固定子或いは回転子の巻線や永久磁石のＮ，Ｓ磁極の内の一方の磁極の磁力線のみが回転力として変換されて、他方の磁極の磁力線は利用されず、回転力として変換されていなかった。従ってその分消費電力を回転力に変換する効率が低下して電動機の発生動力は減少していた。
【０００４】
【発明が解決しようとする課題】本発明は、上述の問題点に鑑みて為されたもので、請求項１から６記載の発明の目的とするところは回転子と固定子よりなる電動機に

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おいて、回転子或いは固定子のＮ，Ｓ磁極の磁力線を利用して、両磁極の磁力線を同時に回転力に変換させることができ、回転力変換効率が向上した電動機を提供するにある。更には固定子或いは回転子の巻線（鉄芯に巻いた巻線）や永久磁石を二重乃至多重にすることで各磁力線の通過率を向上させて磁力線が多く通るようになり、その分磁力が増して回転力変換効率が向上した電動機を提供するにある。
【０００５】また請求項７記載の発明は上記目的に加えて、長期間に亘って安定した性能が得られる電動機を提供するにある。
【０００６】
【課題を解決するための手段】上記目的を達成するために、請求項１記載の発明は回転子と固定子とを出力軸を中心として同心状に配置した構成を基本構成とする電動機において、固定子の磁極に夫々回転子を対面させたものである。また請求項２記載の発明は回転子と固定子とを出力軸を中心として同心状に配置した構成を基本構成とする電動機において、回転子の磁極に夫々固定子を対面させたものである。
【０００７】更に請求項３記載の発明は回転子と、固定子とを交互に同心状に多重に配置するとともに、各回転子を出力軸に連結固定して回転子部を構成したものである。また更に請求項４記載の発明は固定子の内側と、外側とに回転子を同心状に夫々配置して、夫々の回転子を固定子の内側の磁極と、外側の磁極とに対面させるとともにこれら回転子を出力軸に連結固定して回転子部を構成したものである。
【０００８】更にまた請求項５記載の発明は回転子の内側と、外側とに固定子を同心状に夫々配置して、夫々の固定子を回転子の内側の磁極と、外側の磁極とに対面させたものである。また請求項６記載の発明は回転子の内側と、外側とに固定子を同心状に夫々配置して、該回転子の内側と、外側とに夫々の固定子の外側の磁極と、内側の磁極とを対面させたものである。
【０００９】更に請求項７記載の発明は固定子、回転子を夫々支持する各支持部材に対面した回転子、固定子の端部を回転移動自在に係合保持する手段を各支持部材に設けたものである。
【００１０】
【作用】而して請求項１記載或いは請求項４記載の発明の構成によれば、固定子の磁極に夫々回転子を対面させてあるから、各回転子に対面している固定子の磁極の磁力線、つまり磁気エネルギが回転力に変換されることになり、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、同一回転力を得る消費電力が少なくなり、省エネルギが図れる。
【００１１】請求項２記載或いは請求項５記載の発明の構成によれば、回転子の磁極に夫々固定子を対面させたものであるから、各固定子に対面している回転子の磁極

の磁力線、つまり磁気エネルギが回転力に変換されることになり、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、同一回転力を得る消費電力が少なくなり、省エネルギが図れる。

【００１２】更に請求項３記載の発明によれば、回転子と、固定子とを交互に同心状に多重に配置したから、多重に重なった回転子或いは固定子の各磁極が…Ｓ→Ｎ→Ｓ→Ｎ→Ｓ→Ｎ…の順番に重なり、各磁極を通る磁力線の通過率が向上する結果通過する磁力線が多くなる（即ち磁力が強くなる）とともに、磁力線の漏洩が減少し、また固定子或いは回転子の全ての磁極の磁力線の磁気エネルギが回転力に変換され、変換効率は一層向上することになる。また全ての回転子を出力軸に連結固定して回転子部を構成しているから、一本の出力軸の回転力に上記の磁気エネルギが変換されるため、軸受けによる摩擦損失も一本の出力軸だけで済み、そのため回転子、固定子の数が多くなっても消費電力に対する摩擦損失の割合が減少し、回転力に対する変換効率が向上することになる。結果同一回転力を少ない電力で得られ、省エネルギが一層図れることになる。

【００１３】また請求項６記載の発明によれば、回転子の内側と、外側とに夫々の固定子の外側の磁極と、内側の磁極とを対面させたものであるから、夫々の固定子の磁極の両方の磁力線、つまり磁気エネルギが回転力に変換されることになり、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、同一回転力を得る消費電力が少なくなって省エネルギが図れる。

【００１４】請求項７記載の発明によれば、固定子、回転子を夫々支持する各支持部材に対面した回転子、固定子の端部を回転移動自在に係合保持する手段を各支持部材に設けたから、固定子、回転子が互いに係合保持し合って両者の空隙の間隔を長期に亘って一定に保ち、結果長期に亘って安定して磁気エネルギを回転力に変換することができ、安定した性能が得られる。

【００１５】

【実施例】以下本発明を実施例により説明する。

（実施例１）本実施例の電動機は、固定子５が鉄芯と巻線よりなるもので、台座１に固定されたケース２に軸受けにより回転自在に支持された出力軸３に回転子部を固定し、出力軸３とともに回転子部が回転するようになっている。

【００１６】回転子部は出力軸３を中心として同心状に配置された内外の回転子４ａ，４ｂから構成されており、両回転子４ａ、４ｂは図１において左側端部が連結支持部材１０により一体に連結され、連結支持部材１０を介して出力軸３に連結固定されている。固定子５は、両回転子４ａ，４ｂの間に僅かの空隙を介して回転子４ａ，４ｂに対して同心状に配置されたもので、図１において右側端部がケース２の右側内面に一体的に固定されている。

【００１７】そして外側の回転子４ｂは右端部に係合突起６を突出してこの係合突起６を、出力軸３を中心として円周状にケース２の右側内面に形成した係合凹溝７に移動自在に係合保持させ、一方固定子５は図１において左側端部に係合突起８を突設し、この係合突起８の先端を、連結支持部材１０の左側面に出力軸３を中心として円周状に形成した係合凹溝９に移動自在に係合保持させている。これらの係合保持により、回転子部が回転する際に、係合突起６が係合凹溝７内を案内されながら移動し、また係合突起８は係合凹溝９に係合保持されるので回転子部全体はがたつきなくスムーズに回転できるのである。更に長期間高速に回転子部を回転させても固定子５と回転子４ａ，４ｂとの空隙の間隔寸法を安定に維持して、長期に亘って安定した性能を維持することができるのである。

【００１８】ここで両回転子４ａ、４ｂは共に同じ型式のものが使用され、例えば実施例では両回転子４ａ，４ｂは共にヒステリシスリングで構成している。勿論回転子部がかご型導体であれば、両回転子４ａ，４ｂともかご型導体で、また回転子部が巻線と鉄芯とよりなるものであれば、両回転子４ａ，４ｂとも巻線と鉄芯とにて構成し、更に回転子部が永久磁石であれば、両回転子４ａ，４ｂとも永久磁石で構成する。

【００１９】而して本実施例では内側の回転子４ａと、固定子５と、回転子部の外側の回転子４ｂとが出力軸３を中心として同心状に配置されることになり、固定子５或いは回転子部の直径方向のＮ，Ｓ磁極を通る磁力線は図１に示すように、内外の回転子４ａ，４ｂにおいて回転力に変換され、外側の回転子４ｂの分だけ回転力が従来に較べて余分に発生し、少ない電力で従来と同じ回転力が得られることになる。

【００２０】（実施例２）上記実施例１では固定子５の内周と、外周とに回転子部の回転子４ａ，４ｂを同心状に配置したものであるが、本実施例の電動機は図３に示すように台座１に固定されたケース２に軸受けにより回転自在に支持された出力軸３の周部に固定された連結支持部材１０に回転子４の左側端部を図で示すように固定するとともに、ケース２の右側内面に右側端部を固定した固定子５ａ，５ｂを出力軸３を中心として回転子４の内側と外側とに僅かな空隙を介して同心状に配置して構成され、固定子を２重構造としている。そして回転子４の右端面には係合突起１１を突設し、この係合突起１１をケース２の右側内面に出力軸３を中心として形成した円周状の係合凹溝１２に移動自在に係合保持させ、一方固定子５ａ，５ｂも左側端部に係合突起１３ａ，１３ｂを突設し、連結支持部材１０の右側面に出力軸３を中心として形成した円周状の係合凹溝１４ａ，１４ｂに移動自在に係合保持させてあり、実施例１と同様に回転子４の回転時において係合突起１１が係合凹溝１２内を案内

されながら移動し、また係合突起１３ａ，１３ｂは夫々係合凹溝１４ａ，１４ｂに係合保持されるので回転子４の回転をがたつきのないスムーズなものとしている。更に長期間高速に回転子４を回転させても回転子４と固定子５ａ，５ｂとの空隙の間隔寸法を安定に維持して、長期に亘って安定した性能を保持することができるのである。

【００２１】而して本実施例にあっても回転子４と、内周側の固定子５ａと、外周側の固定子５ｂとが出力軸３を中心として同心状に配置されることになり、固定子５ａ，５ｂ或いは回転子４の直径方向のＮ，Ｓ磁極を通る磁力線の通過率が向上する結果通過する磁力線が多くなる（即ち磁力が強くなる）とともに、磁力線の漏洩が減少し、また固定子５ａ，５ｂ或いは回転子４の全ての磁極の磁力線の磁気エネルギが回転力に変換され、エネルギ変換効率が向上することになる。

【００２２】尚本実施例での回転子４のＮ，Ｓ磁極に夫々固定子５ａ，５ｂを対面させた場合では、回転子４のＮ，Ｓ磁極の両方の磁力線つまり磁気エネルギが回転力に変換されることになり、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上することになる。また本実施例での回転子４の内側と外側とに夫々の固定子５ａ，５ｂの外側の磁極と、内側の磁極とを対面させた場合では、夫々の固定子５ａ，５ｂの各磁極の両方の磁力線、つまり磁気エネルギが回転力に変換されることになり、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上することになる。

【００２３】（実施例３）上記実施例１又は２は回転子が２重構造又は固定子が２重構造となったものであるが、図４に示すように夫々を多重構造としても良い。本実施例の場合は出力軸３に固定した回転子４ａと、この回転子４ａと同心状に空隙を介して外側に配置された固定子５ａと、更にこの固定子５ａの外側に同心状に空隙を介して配置された回転子４ｂと、この回転子４ｂと同心状に空隙を介して外側に配置された固定子５ｂと、更にこの固定子５ｂの外側に同心状に空隙を介して配置された回転子４ｃとで、固定子を２重構造とし回転子を３重構造としている。

【００２４】そして各固定子５ａ，５ｂは図において右側端部をケース２の右側内面に固定している。一方回転子４ａ，４ｂ，４ｃは左側端部を連結支持部材１０の右側面に連結固定して回転子部を構成している。そして回転子４ａ，４ｂ，４ｃの右端面には係合突起１７ａ，１７ｂ，１７ｃを突設し、この係合突起１７ａ，１７ｂ，１７ｃをケース２の右側内面に出力軸３を中心として形成した円周状の係合凹溝１８ａ，１８ｂ，１８ｃに移動自在に係合保持させ、一方固定子５ａ，５ｂの左側端面にも係合突起１９ａ，１９ｂを突設し、連結支持部材１０の右側面に出力軸３を中心として形成した円周状の係合凹溝１５ａ，１５ｂに移動自在に係合保持させてある。これらの係合保持により実施例１と同様に回転子部が回転する際に、係合突起１７ａ，１７ｂ，１７ｃが夫々係合凹溝１８ａ，１８ｂ，１８ｃ内を案内されながら移動し、また係合突起１９ａ，１９ｂは夫々係合凹溝１５ａ，１５ｂに係合保持されるので、回転子４ａ，４ｂ，４ｃはがたつきなくスムーズに回転できて、長期間高速に回転子部を回転させても固定子５ａ，５ｂと回転子４ａ，４ｂ，４ｃとの各空隙の間隔寸法を安定に維持して、長期に亘って安定した性能を維持することができるのである。

【００２５】而して本実施例にあっても回転子部の回転子４ａ，４ｂ，４ｃと、固定子５ａ，５ｂとが出力軸３を中心として同心状に配置されることになり、固定子５ａ，５ｂ或いは回転子４ａ，４ｂ，４ｃの直径方向の磁極は図４に示すように…Ｓ→Ｎ→Ｓ→Ｎ→Ｓ→Ｎ…の順番に重なり、各磁極を通る磁力線の通過率が向上する結果通過する磁力線が多くなる（即ち磁力が強くなる）とともに、磁力線の漏洩が減少して、また固定子５ａ，５ｂ或いは回転子４ａ，４ｂ，４ｃの全ての磁極の磁力線の磁気エネルギが回転力に変換され、エネルギ変換効率が向上することになる。その上全ての回転子４ａ，４ｂ，４ｃを出力軸３に固定して回転子部を構成しているから、一本の出力軸３の回転力に上記磁気エネルギが変換されるため、軸受けによる摩擦損失も一本の出力軸３だけで済み、そのため回転子、固定子の数が多くなっても消費電力に対する摩擦損失の割合が減少し、動力変換効率が向上することになる。

【００２６】尚実施例３の回転子部の回転子の数、固定子の数は上記実施例に特に限定されるものでなく、交互に同心状に配置することにより、更に多重構造としても良い。以上示した実施例１～実施例３での各係合突起と係合凹溝はベアリング様式等のあらゆる係合方法を用いて良いことは勿論である。

【００２７】尚以上示した実施例１～３は説明のためのもので、もとよりこれらによって制限を受けるものでなく、本発明の精神を逸脱しない限り種々の変更を許容し得ることは勿論である。また本発明の全ては、インダクションモータ、コンデンサモータ、各種同期電動機、ヒステリシス電動機、各種交流整流子電動機、各種直流電動機、整流子モータ、ブラシレスモータ、高周波電動機、特殊同期電動機、ステッピングモータ、接点電動機、マグネットモータ等、固定子と回転子とからなるあらゆる電動機に適用できるものであって、実施例に特に限定されない。

【００２８】

【発明の効果】請求項１記載或いは請求項４記載の発明は固定子の磁極に夫々回転子を対面させてあるから、各回転子に対面する固定子の磁極の磁力線、つまり磁気エネルギを回転力に変換することができ、従来の一方の磁

極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、結果同一回転力を得る消費電力が少なくなり、省エネルギが図れるという効果がある。

【００２９】また請求項２記載或いは請求項５記載の発明は回転子の磁極に夫々固定子を対面させたから、各固定子に対面する回転子の磁極の磁力線、つまり磁気エネルギを回転力に変換することができ、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、しかもこの発明は回転子の内側と、外側とに固定子を出力軸を中心として同心状に夫々配置させたから、夫々の固定子或いは回転子の直径方向の磁極を通る磁力線の通過率が向上する結果、通過する磁力線が多くなる（即ち磁力が強くなる）とともに、磁力線の漏洩が減少して、また固定子或いは回転子の全ての磁極の磁力線の磁気エネルギが回転力に変換されエネルギ変換効率が向上することになる結果同一回転力を得る消費電力が少なくなり、省エネルギが図れるという効果がある。

【００３０】また請求項６記載の発明は回転子の内側と、外側とに夫々の固定子の外側の磁極と、内側の磁極とを対面させたから、夫々の固定子の各磁極の両方の磁力線、つまり磁気エネルギを回転力に変換することができ、従来の一方の磁極の磁力線のみが回転力に変換される電動機に較べて変換効率が向上し、結果同一回転力を得る消費電力が少なくなり、省エネルギが図れるという効果がある。

【００３１】請求項３記載の発明は、回転子と、固定子とを交互に同心状に多重に配置したから、多重に重なった回転子或いは固定子のＮ，Ｓ磁極が…Ｓ→Ｎ→Ｓ→Ｎ→Ｓ→Ｎ…の順番に重なり、各磁極を通る磁力線の通過率が向上する結果通過する磁力線が多くなる（即ち磁力が強くなる）とともに、磁力線の漏洩が減少して、また固定子或いは回転子の全ての磁極の磁力線の磁気エネルギが回転力に変換され、変換効率を一層向上することができ、また全ての回転子を出力軸に連結固定して回転子部を構成しているから、一本の出力軸の回転力に上記の磁気エネルギを変換でき、そのため軸受けによる摩擦損失も一本の出力軸だけで済み、回転子、固定子の数が多くなっても消費電力に対する摩擦損失の割合が減少し、回転力に対する変換効率が向上し、結果同一回転力を少ない電力で得られ、省エネルギが一層図れるという効果がある。

【００３２】請求項７記載の発明は固定子、回転子を夫々支持する各支持部材に対面した回転子、固定子の端部を回転移動自在に係合保持する手段を各支持部材に設けたから、固定子、回転子が互いに係合保持し合って回転子の回転をがたつきのないスムーズなものとし、更に長期間高速に回転子を回転させても回転子と固定子との空隙の間隔を安定に維持して、長期に亘って安定して磁気エネルギを回転力に変換することができ、安定した性能が得られるという効果を奏する。

【図面の簡単な説明】

【図１】本発明の実施例１の概略構成を示す側断面図である。

【図２】本発明の実施例１の概略構成を示す正面断面図である。

【図３】本発明の実施例２の概略構成を示す側断面図である。

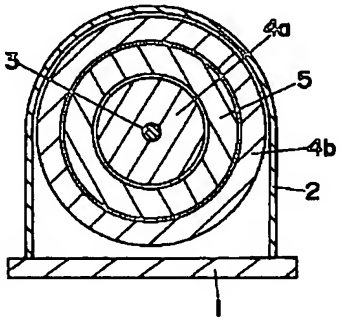
【図４】本発明の実施例３の概略構成を示す側断面図である。

【図５】本発明の実施例３の回転子、固定子部分の概略構成を示す正面断面図である。

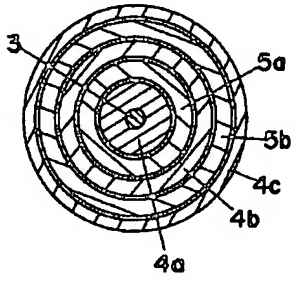
【符号の説明】

１	台座
２	ケース
３	出力軸
４ａ，４ｂ	回転子
５	固定子
６	係合突起
７	係合凹溝
８	係合突起
９	係合凹溝
１０	連結支持部材

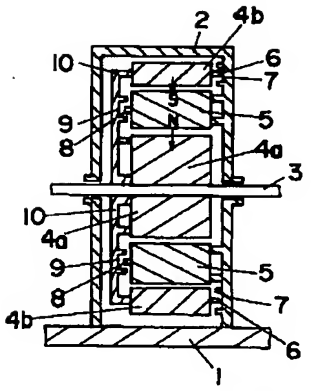
【図２】



【図５】

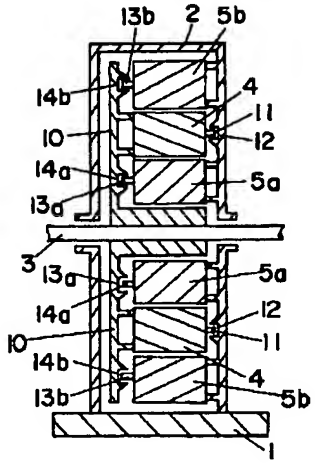


【図1】

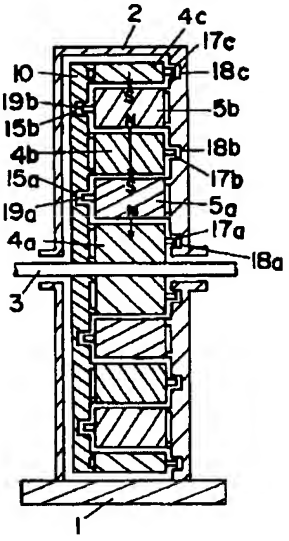


1	台座
2	ケース
3	出力軸
4a, 4b	回転子
5	固定子
6	係合突起
7	係合凹溝
8	係合突起
9	係合凹溝
10	逆結支持部材

【図3】



【図4】



PATENT ABSTRACTS OF JAPAN

(11)Publication number : **05-146121**

(43)Date of publication of application : **11.06.1993**

(51)Int.CI. **H02K 16/02**

H02K 21/12

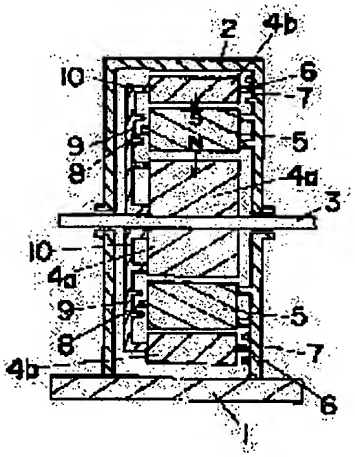
(21)Application number : **03-300889**

(22)Date of filing : **16.11.1991**

(71)Applicant : **YAMAUCHI HIDEKI**

(72)Inventor : **YAMAUCHI HIDEKI**

(54) **MOTOR**



(57)Abstract:

PURPOSE: To provide a motor having higher torque converting efficiency by converting the magnetic lines of force of the N and S magnetic poles of the rotor or stator into torque simultaneously.

CONSTITUTION: A rotor part is composed of internal and external rotors 4a and 4b arranged concentrically around its output axis 3 as a center, and the rotors 4a and 4b are coupled into one united body with a coupling and supporting member 10 at their left-hand ends and fixed to the output axis 3 through the medium of the coupling and supporting member 10. A stator 5 is arranged between both rotors 4a and 4b concentrically to the rotors 4a and 4b, and its right-hand end part is united with the right-hand internal surface of a case 2 into one body and fixed. The external rotor 4b has a linking protrusion 6 at the right-hand end, and this linking protrusion 6 is linked in a freely rotatable and movable state to a linking recessed groove 7 formed on the right-hand internal surface of the case 2 circularly around the output axis 3 as a center. Whereas, the stator 5 has a linking and fixing protrusion 8 at its left- hand end, and linked in a freely rotatable and movable state to a circular linking recessed groove 9 formed on the left side surface of the coupling and supporting member 10.

LEGAL STATUS

[Date of request for examination]	07.09.1998
[Date of sending the examiner's decision of rejection]	21.08.2001

CLAIMS

[Claim(s)]

[Claim 1] The motor characterized by making a rotator meet the magnetic pole of a stator, respectively in the motor which considers the configuration which has arranged the rotator and the stator in the shape of a said alignment centering on an output shaft as a basic configuration.

[Claim 2] The motor characterized by making a stator meet the magnetic pole of a rotator, respectively in the motor which considers the configuration which has arranged the rotator and the stator in the shape of a said alignment centering on an output shaft as a basic configuration.

[Claim 3] The motor according to claim 1 or 2 characterized by having carried out connection immobilization of each rotator at the output shaft, and constituting the rotator section while having arranged the rotator and the stator to multiplex in the shape of a said alignment by turns.

[Claim 4] The motor according to claim 1 or 3 characterized by having carried out connection immobilization of these rotators at the output shaft, and constituting the rotator section while arranging a rotator in the shape of a said alignment on the inside of a stator, and the outside, respectively and making each rotator meet the magnetic pole inside a stator, and an outside magnetic pole.

[Claim 5] The motor according to claim 2 or 3 characterized by having arranged the stator in the shape of a said alignment on the inside of a rotator, and the outside, respectively, and making each stator meet the magnetic pole inside a rotator, and an outside magnetic pole.

[Claim 6] The motor according to claim 2 or 3 characterized by having arranged the stator in the shape of a said alignment on the inside of a rotator, and the outside, respectively, and making the magnetic pole of the outside of each stator, and an inside magnetic pole meet the inside of this rotator, and an outside.

[Claim 7] A motor claim 1 characterized by forming the means which enables engagement maintenance of the rotation of the edge of a stator, the rotator which met each supporter material which supports a rotator, respectively, and a stator in each supporter material, 2, 3, 4, 5, or given in six.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to a motor.
[0002]
[Description of the Prior Art] Many of various kinds of conventional motors consisted of a rotator and a stator, and it arranged the rotator so that N of a stator with a stator winding or the stator which consists of a permanent magnet, and either of the S magnetic poles might be met. Moreover, the stator was made to meet only the coil of a rotator or N of a permanent magnet, and either of the S magnetic poles in another motor.
[0003] With such a configuration, only the line of magnetic force of one magnetic pole of the coil of a stator or a rotator, N of a permanent magnet, and the S magnetic poles was changed as a turning effort, and the line of magnetic force of the magnetic pole of another side was not used, and was not changed as a turning effort. Therefore, the effectiveness which changes the part power consumption into turning effort fell, and the generating power of a motor was decreasing.
[0004]
[Problem(s) to be Solved by the Invention] Succeeding in this invention in view of the above-mentioned trouble, in the motor which consists of a rotator and a stator, using N of a rotator or a stator, and the line of magnetic force of S magnetic pole, the place made into the purpose of invention given in six from claim 1 can make turning effort change the line of magnetic force of both magnetic poles into coincidence, and is to offer the motor whose turning-effort conversion efficiency improved. Furthermore, it is in offering the motor whose turning-effort conversion efficiency raised the transmission coefficient of each line of magnetic force by making a duplex thru/or multiplex the coil (coil coiled around the iron core) and permanent magnet of a stator or a rotator, and line of magnetic force came to pass mostly, gained in the part magnetism, and improved.
[0005] Moreover, offering the motor with which the engine performance continued and stabilized at the long period of time is obtained in addition to the above-mentioned purpose has invention according to claim 7.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention according to claim 1 makes a rotator meet the magnetic pole of a stator in the motor which considers the configuration which has arranged the rotator and the stator in the shape of a said alignment centering on an output shaft as a basic configuration, respectively. Moreover, invention according to claim 2 makes a stator meet the magnetic pole of a rotator in the motor which considers the configuration which has arranged the rotator and the stator in the shape of a said alignment centering on an output shaft as a basic configuration, respectively.
[0007] Furthermore, invention according to claim 3 carries out connection immobilization of each rotator at an output shaft, and constitutes the rotator section while it arranges a rotator and a stator to multiplex in the shape of a said alignment by turns. Furthermore, invention according to claim 4 carries out connection immobilization of these rotators at an output shaft, and constitutes the rotator section while it arranges a rotator in the shape of a said alignment on the inside of a stator, and the outside, respectively and makes each rotator meet the magnetic pole inside a stator, and an outside magnetic pole.

[0008] Furthermore, invention according to claim 5 arranges a stator in the shape of a said alignment on the inside of a rotator, and the outside, respectively, and makes each stator meet the magnetic pole inside a rotator, and an outside magnetic pole again. Moreover, invention according to claim 6 arranges a stator in the shape of a said alignment on the inside of a rotator, and the outside, respectively, and makes the magnetic pole of the outside of each stator, and an inside magnetic pole meet the inside of this rotator, and an outside.
[0009] Furthermore, invention according to claim 7 forms the means which enables engagement maintenance of the rotation of the edge of a stator, the rotator which met each supporter material which supports a rotator, respectively, and a stator in each supporter material.
[0010]
[Function] Since it **, and the rotator is made to have met the magnetic pole of a stator, respectively according to the claim 1 publication or the configuration of invention according to claim 4, conversion efficiency improves compared with the motor from which the line of magnetic force of the magnetic pole of the stator which has met each rotator, i.e., magnetic energy, will be changed into turning effort, and only the line of magnetic force of one conventional magnetic pole is changed into turning effort, the power consumption which acquires the same turning effort is decreased, and energy saving can be aimed at.
[0011] According to claim 2 publication or the configuration of invention according to claim 5, since a stator is made to meet the magnetic pole of a rotator, respectively, conversion efficiency improves compared with the motor from which the line of magnetic force of the magnetic pole of the rotator which has met each stator, i.e., magnetic energy, will be changed into turning effort, and only the line of magnetic force of one conventional magnetic pole is changed into turning effort, the power consumption which acquires the same turning effort is decreased, and energy saving can be aimed at.
[0012] Furthermore, since the rotator and the stator have been arranged to multiplex in the shape of a said alignment by turns according to invention according to claim 3 Each magnetic pole of the rotator which lapped with multiplex, or a stator -- The line of magnetic force passed as a result of the improvement of the transmission coefficient of the line of magnetic force of S->N->S->N->S->N-- which laps in order and passes along each magnetic pole with many (that is, magnetism becomes strong) Leakage of line of magnetic force will decrease, and the magnetic energy of the line of magnetic force of all the magnetic poles of a stator or a rotator will be changed into turning effort, and conversion efficiency will improve further. Moreover, since connection immobilization of all the rotators is carried out at an output shaft, the rotator section is constituted and the above-mentioned magnetic energy is changed into the turning effort of one output shaft, only one output shaft is required, therefore even if the number of a rotator and stators increases, the rate of friction loss to power consumption will decrease, and the conversion efficiency of friction loss by the bearing over turning effort will improve. Result same turning effort will be acquired with little power, and energy saving can be aimed at further.
[0013] Moreover, according to invention according to claim 6, since the magnetic pole of the outside of each stator and an inside magnetic pole are made to meet the inside of a rotator, and an outside, conversion efficiency improves compared with the motor from

which the line of magnetic force of both magnetic poles of each stator, i.e., magnetic energy, will be changed into turning effort, and only the line of magnetic force of one conventional magnetic pole is changed into turning effort, the power consumption which acquires the same turning effort is decreased, and energy saving can be aimed at.
[0014] Since the means which enables engagement maintenance of the rotation of the edge of a stator, the rotator which met each supporter material which supports a rotator, respectively, and a stator was formed in each supporter material according to invention according to claim 7, engagement maintenance is carried out mutually, and a stator and a rotator continue at a long period of time, keeps spacing of both opening constant, is continued and stabilized at a result long period of time, magnetic energy can change into turning effort, and the stable engine performance is obtained.
[0015]
[Example] An example explains this invention below.
(Example 1) A stator 5 consists of an iron core and a coil, the motor of this example fixes the rotator section to the output shaft 3 supported free [rotation] by the bearing by the case 2 fixed to the plinth 1, and the rotator section rotates it with an output shaft 3.
[0016] The rotator section consists of internal and external rotators 4a and 4b arranged in the shape of a said alignment centering on an output shaft 3, in drawing 1 , a left-hand side edge is connected with one by the connection supporter material 10, and connection immobilization of both the rotators 4a and 4b is carried out through the connection supporter material 10 at the output shaft 3. The stator 5 has been arranged in the shape of a said alignment to Rotators 4a and 4b through few openings among both the rotators 4a and 4b, and the right-hand side edge is being fixed to the right-hand side inside of a case 2 in one in drawing 1 .
[0017] Outside rotator 4b the engagement projection 6 in the right end section and the engagement projection 6 of a projection lever Engagement maintenance of the migration to the engagement concave 7 formed in the right-hand side inside of a case 2 in the shape of a periphery centering on the output shaft 3 is enabled. On the other hand, a stator 5 protrudes the engagement projection 8 on a left-hand side edge in drawing 1 , and enables engagement maintenance of the migration to the engagement concave 9 which formed the tip of this engagement projection 8 in the left lateral of the connection supporter material 10 in the shape of a periphery centering on the output shaft 3. While the engagement projection 6 is guided in the inside of the engagement concave 7, it moves, and in case the rotator section rotates, since engagement maintenance is carried out by these engagement maintenance at the engagement concave 9, the engagement projection 8 shakes and the whole rotator section can rotate it smoothly [there is nothing and] by it. Furthermore, even if it makes a high speed rotate the rotator section for a long period of time, the spacing dimension of the opening of a stator 5 and Rotators 4a and 4b can be maintained to stability, and the engine performance continued and stabilized at the long period of time can be maintained.
[0018] The thing of the same form is both used, for example, both the rotators 4a and 4b constitute both the rotators 4a and 4b of both from an example in the hysteresis ring here. of course -- the rotator section -- a cage mold -- if it is a conductor -- both the rotators 4a and 4b -- a cage mold -- it is a conductor, and if the rotator section consists of a coil and an iron core, both the rotators 4a and 4b are constituted from a coil and an iron core, and if the rotator section is a permanent magnet further, both the rotators 4a and 4b consist of

permanent magnets.
[0019] Will ** and inside rotator 4a, a stator 5, and rotator 4b of the outside of the rotator section will be arranged in the shape of a said alignment centering on an output shaft 3 in this example. As the line of magnetic force which passes along N of the diameter direction of a stator 5 or the rotator section and S magnetic pole is shown in drawing 1 , it is changed into turning effort in the internal and external rotators 4a and 4b, and turning effort will generate only the part of outside rotator 4b too much compared with the former, and the same turning effort as the former will be acquired with little power.
[0020] (Example 2) Although the rotators 4a and 4b of the rotator section are arranged in the shape of a said alignment on the inner circumference of a stator 5, and a periphery in the above-mentioned example 1 While the motor of this example fixes the left-hand side edge of a rotator 4 to the connection supporter material 10 fixed to the periphery of the output shaft 3 supported free [rotation] by the bearing by the case 2 fixed to the plinth 1 as shown by a diagram as shown in drawing 3 The stators 5a and 5b which fixed the right-hand side edge to the right-hand side inside of a case 2 are arranged in the shape of a said alignment through few openings on the inside and the outside of a rotator 4 centering on an output shaft 3, it is constituted, and the stator is made into double structure. And protrude the engagement projection 11 on the right end side of a rotator 4, and engagement maintenance of the migration of this engagement projection 11 to the engagement concave 12 of the shape of a periphery which formed the output shaft 3 in the right-hand side inside of a case 2 as a core is enabled. On the other hand, Stators 5a and 5b also protrude the engagement projections 13a and 13b on a left-hand side edge. Engagement maintenance of the migration to the engagement concaves 14a and 14b of the shape of a periphery which formed the output shaft 3 in the right lateral of the connection supporter material 10 as a core is enabled. Since it moves while the engagement projection 11 is guided in the inside of the engagement concave 12 like an example 1 at the time of rotation of a rotator 4, and engagement maintenance of the engagement projections 13a and 13b is carried out at the engagement concaves 14a and 14b, respectively, rotation of a rotator 4 is made smooth without shakiness. Furthermore, even if it makes a high speed rotate a rotator 4 for a long period of time, the spacing dimension of the opening of a rotator 4 and Stators 5a and 5b can be maintained to stability, and the engine performance continued and stabilized at the long period of time can be held.
[0021] Even if it ** and is in this example, a rotator 4, stator 5a by the side of inner circumference, and stator 5b by the side of a periphery will be arranged in the shape of a said alignment centering on an output shaft 3. The line of magnetic force passed as a result of the improvement of the transmission coefficient [N of the diameter direction of Stators 5a and 5b or a rotator 4 and] of the line of magnetic force which passes along S magnetic pole with many (that is, magnetism becomes strong) Leakage of line of magnetic force will decrease, and the magnetic energy of the line of magnetic force of all the magnetic poles of Stators 5a and 5b or a rotator 4 will be changed into turning effort, and an energy conversion efficiency will improve.
[0022] In addition, in the case where Stators 5a and 5b are made to meet N of the rotator 4 in this example, and S magnetic pole, respectively, conversion efficiency will improve compared with the motor from which it will be changed into turning effort, both the line of magnetic force, i.e., the magnetic energy, of N of a rotator 4, and S magnetic pole, and

only the line of magnetic force of one conventional magnetic pole is changed into turning effort. Moreover, in the case where the magnetic pole of the outside of each stator 5a and 5b and an inside magnetic pole are made to meet the inside and the outside of a rotator 4 in this example, conversion efficiency will improve compared with the motor from which the line of magnetic force of both each magnetic poles of each stator 5a and 5b, i.e., magnetic energy, will be changed into turning effort, and only the line of magnetic force of one conventional magnetic pole is changed into turning effort.

[0023] (Example 3) The above-mentioned example 1 or 2 has a good rotator also considering each as the multiplet structure, as it shows drawing 4 , although double structure or a stator serves as double structure. Rotator 4a which fixed to the output shaft 3 in the case of this example, and this rotator 4a and stator 5a arranged outside through an opening in the shape of a said alignment, Furthermore, rotator 4b arranged through an opening on the outside of this stator 5a in the shape of a said alignment, By this rotator 4b, stator 5b arranged outside through an opening in the shape of a said alignment, and rotator 4c further arranged through an opening on the outside of this stator 5b in the shape of a said alignment, a stator is made into double structure and the rotator is made into 3-fold structure.

[0024] And each stators 5a and 5b are fixing the right-hand side edge to the right-hand side inside of a case 2 in drawing. On the other hand, Rotators 4a, 4b, and 4c carry out connection immobilization of the left-hand side edge at the right lateral of the connection supporter material 10, and constitute the rotator section. And the engagement projections 17a, 17b, and 17c are protruded on the right end side of Rotators 4a, 4b, and 4c. Engagement maintenance of the migration of these engagement projections 17a, 17b, and 17c to the engagement concaves 18a, 18b, and 18c of the shape of a periphery which formed the output shaft 3 in the right-hand side inside of a case 2 as a core is enabled. On the other hand, the engagement projections 19a and 19b are protruded also on the left-hand side end face of Stators 5a and 5b, and engagement maintenance of the migration to the engagement concaves 15a and 15b of the shape of a periphery which formed the output shaft 3 in the right lateral of the connection supporter material 10 as a core is enabled. In case the rotator section rotates like an example 1 by these engagement maintenance Since it moves while the engagement projections 17a, 17b, and 17c are guided in the inside of the engagement concaves 18a and 18b and 18c, respectively, and engagement maintenance of the engagement projections 19a and 19b is carried out at the engagement concaves 15a and 15b, respectively It shakes and can rotate smoothly [there is nothing and], even if Rotators 4a, 4b, and 4c make a high speed rotate the rotator section for a long period of time, they can maintain the spacing dimension of each opening of Stators 5a and 5b and Rotators 4a, 4b, and 4c to stability, and they can maintain the engine performance continued and stabilized at the long period of time.

[0025] Even if it ** and is in this example, the rotators 4a, 4b, and 4c of the rotator section and Stators 5a and 5b will be arranged in the shape of a said alignment centering on an output shaft 3. The magnetic pole of the diameter direction of Stators 5a and 5b or Rotators 4a, 4b, and 4c is --S->N->S->N->S->N, as shown in drawing 4 . -- It laps in order. The line of magnetic force passed as a result of the improvement of the transmission coefficient of the line of magnetic force which passes along each magnetic pole with many (that is, magnetism becomes strong) Leakage of line of magnetic force will decrease, and the magnetic energy of the line of magnetic force of all the magnetic

poles of Stators 5a and 5b or Rotators 4a, 4b, and 4c will be changed into turning effort, and an energy conversion efficiency will improve. Since all the rotators 4a, 4b, and 4c are moreover fixed to an output shaft 3, the rotator section is constituted and the above-mentioned magnetic energy is changed into the turning effort of one output shaft 3, only one output shaft 3 is required, therefore even if the number of a rotator and stators increases, the rate of friction loss to power consumption will decrease, and power conversion efficiency of friction loss by the bearing will improve.

[0026] In addition, the number of the rotators of the rotator section of an example 3 and especially the number of stators are still better also as the multiplet structure by not being limited to the above-mentioned example and arranging in the shape of a said alignment by turns. As for each engagement projection in the example 1 shown above - the example 3, and an engagement concave, it is needless to say that all the engagement approaches, such as a bearing format, may be used.

[0027] In addition, the examples 1-3 shown above are the things for explanation, and unless these do not receive a limit from the first and it deviates from the pneuma of this invention, of course, various modification can be permitted. Moreover, all this inventions cannot be applied to all motors that consist of a stator and a rotator, such as an induction motor, a capacitor motor, various synchronous motors, a hysteresis motor, various AC commutator motors, various direct current motors, a commutator motor, a brushless motor, a RF motor, a special synchronous motor, a stepping motor, a contact motor, and a magnet motor, and it is not limited to especially an example.

[0028]

[Effect of the Invention] Since claim 1 publication or invention according to claim 4 makes the rotator have met the magnetic pole of a stator, respectively, it can change into turning effort the line of magnetic force of the magnetic pole of the stator which meets each rotator, i.e., magnetic energy, and its conversion efficiency improves compared with the motor from which only the line of magnetic force of one conventional magnetic pole is changed into turning effort, it decreases the power consumption which acquires result same turning effort, and is effective in the ability to aim at energy saving.

[0029] Moreover, since claim 2 publication or invention according to claim 5 made the stator meet the magnetic pole of a rotator, respectively The line of magnetic force of the magnetic pole of the rotator which meets each stator, i.e., magnetic energy, can be changed into turning effort, and conversion efficiency improves compared with the motor from which only the line of magnetic force of one conventional magnetic pole is changed into turning effort. Moreover, this invention The inside of a rotator, Since the stator was arranged in the shape of a said alignment centering on the output shaft outside, respectively, as a result of the transmission coefficient of the line of magnetic force which passes along the magnetic pole of the diameter direction of each stator or a rotator improving, the line of magnetic force to pass with many (that is, magnetism becomes strong) Leakage of line of magnetic force decreases, and the power consumption which acquires the same turning effort as a result of changing the magnetic energy of the line of magnetic force of all the magnetic poles of a stator or a rotator into turning effort and an energy conversion efficiency's improving is decreased, and it is effective in the ability to aim at energy saving.

[0030] Invention according to claim 6 on the inside of a rotator, and the outside Moreover, the magnetic pole of the outside of each stator, Since the inside magnetic pole

was made to meet, the line of magnetic force of both each magnetic poles of each stator, That is, magnetic energy can be changed into turning effort, conversion efficiency improves compared with the motor from which only the line of magnetic force of one conventional magnetic pole is changed into turning effort, the power consumption which acquires result same turning effort is decreased, and it is effective in the ability to aim at energy saving.

[0031] Since invention according to claim 3 has arranged the rotator and the stator to multiplex in the shape of a said alignment by turns N of the rotator which lapped with multiplex, or a stator, and S magnetic pole -- The line of magnetic force passed as a result of the improvement of the transmission coefficient of the line of magnetic force of S->N->S->N->S->N-- which laps in order and passes along each magnetic pole with many (that is, magnetism becomes strong) Leakage of line of magnetic force decreases, and the magnetic energy of the line of magnetic force of all the magnetic poles of a stator or a rotator is changed into turning effort. Since conversion efficiency can be improved further, and connection immobilization of all the rotators is carried out at an output shaft and the rotator section is constituted Can change the above-mentioned magnetic energy into the turning effort of one output shaft, therefore the friction loss by the bearing also requires only one output shaft. Even if the number of a rotator and stators increases, the rate of friction loss to power consumption decreases, the conversion efficiency over turning effort improves, result same turning effort is acquired with little power, and it is effective in the ability to aim at energy saving further.

[0032] The rotator to which invention according to claim 7 met each supporter material to which a stator and a rotator are supported, respectively, Since the means which enables engagement maintenance of the rotation of the edge of a stator was formed in each supporter material Even if a stator and a rotator carry out engagement maintenance mutually, it makes rotation of a rotator smooth without shakiness and it makes a high speed rotate a rotator further for a long period of time, spacing of the opening of a rotator and a stator is maintained to stability. It is continued and stabilized at a long period of time, magnetic energy can be changed into turning effort, and the effectiveness that the stable engine performance is obtained is done so.

TECHNICAL FIELD

[Industrial Application] This invention relates to a motor.